① Find the vertex and x-int.

ⓐ $y = 2x^2 + 14x + 20$ (1·20, 2·10, 4·5; 1·2)

vertex $x = \frac{-b}{2a}$ $\frac{-14}{2(2)} = \frac{-14}{4} = \frac{-7}{2} = -3.5$

$2(-3.5)^2 + 14(-3.5) + 20$

y = plug x back in $y = -4.5$

$(-3.5, -4.5)$

$(2x + 4)(1x + 5)$

$x = -2, -5$

ⓑ $y = 3(x-2)^2 - 27$

ⓒ $y = 4(x-3)(x+5)$

$y = 3(x-2)^2 - 27$

Vertex $(2, -27)$

$0 = 3(x-2)^2 - 27$

$+27 \qquad +27$

$\frac{27}{3} = \frac{3}{3}(x-2)^2$

$\sqrt{9} = \sqrt{(x-2)^2} \rightarrow \pm 3 = x-2$

$+2 \qquad +2$

$X = 5, -1$

$y = 4(x-3)(x+5)$

$0 = 4(x-3)(x+5)$

x-int = 3, −5

$\frac{3+-5}{2} = -1$

$4(-1-3)(-1+5) = -64$

Vertex

$(-1, -64)$

2.2

Polynomials

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + \dots a_1 x^1 + a_0 x^0$$

5^{th} degree $= x^5 - 4x^2 + 5$

3^{rd} degree $= 5x^3 - 4x^2 + 5x + 7$

8^{th} degree $= -7x^8 - 4$

1^{st} degree $= x + 4$

Continuous

Smooth curves

Degree (highest exponent)

Finding zeros of polynomials one of the most important tasks Algebra

CL. 1 – middle

CL. 2 – Hardest

CL. 3 – easiest

CL. 7 – middle

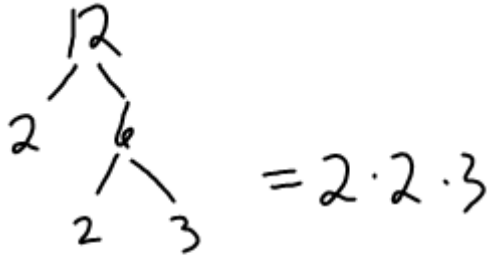
CL. 8 – middle

Fundamental Thm of Arithmetic → every # decomposed into product of primes

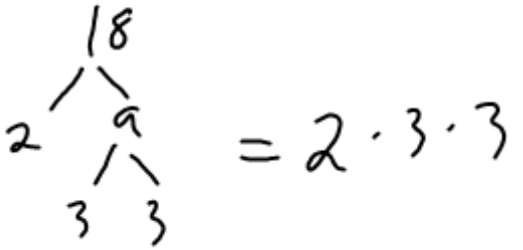
Fundamental Thm of Algebra

" " Calculus

"



$= 2 \cdot 2 \cdot 3$



$= 2 \cdot 3 \cdot 3$

informal

the number of possible ~~zeros~~ x-int

is at most equal to the degree

incld. imaginaries equals degree

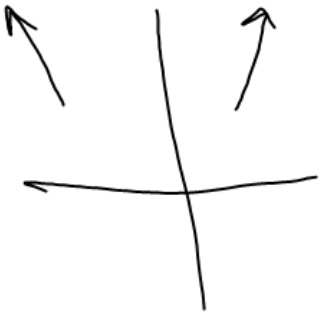
Even/odd degree Leading Coefficient

Leading coefficient is the (number) coefficient attached to the highest degree term

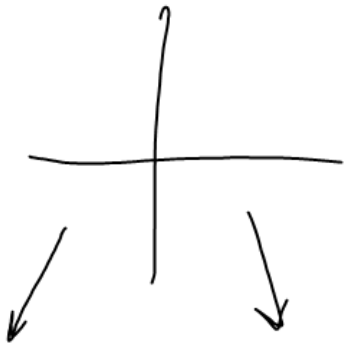
$y = -3x^4 + 8x^2 + 4$ L.C. = 3

$y = 3x^4 + 7x^8 + 5x^5$ L.C. = 7

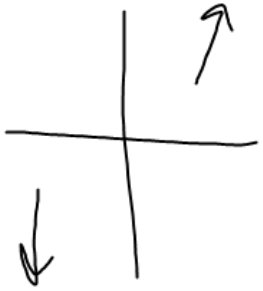
even degree pos. L.C.



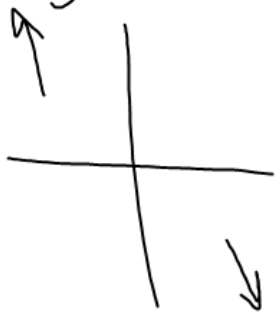
even degree, neg. L.C.



odd degree pos L.C.



odd degree w/ neg L.C.



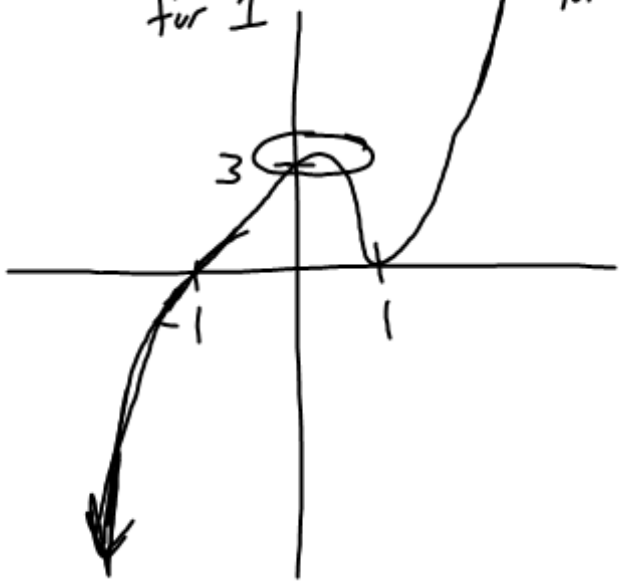
Repeated Zeros

degree = 5

$y = 3(x-1)^2(x+1)^3 = 3(x-1)(x-1)(x+1)(x+1)(x+1)$

multiplicity of 2 for 1

multiplicity of 3 for -1



even multiplicity "bounces"

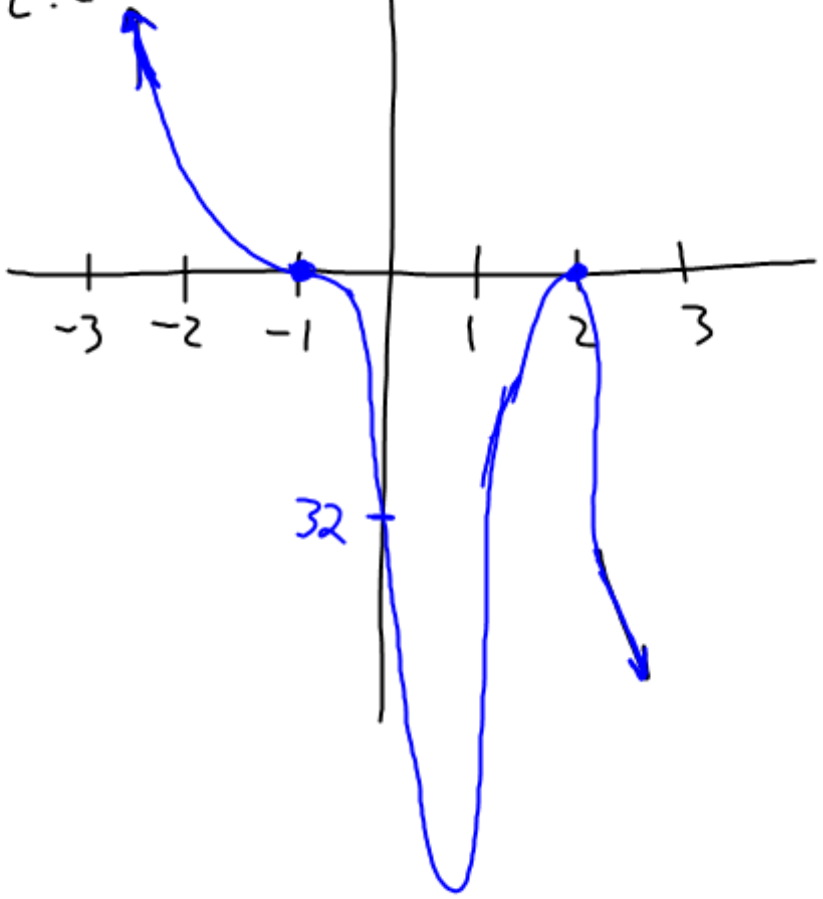
odd multiplicity "crosses"

$f(x) = -2(x+1)^5(x-2)^4$

cross bounce

degree = 9

L.C. = neg



To Sketch Graph

- Find degree (even/odd)
- Find Leading Coefficient (pos/neg)
- Find Zeros
- Find the multiplicity of the Zeros (bounce/cross)

Sect. 2.2

#1-8, 9-12(1), 17-24(2), 28, 32, 35, 38

no calc.